University of Gdańsk

Subject card

Subject name and code	Databases, PG_00143843		
Field of study	Informatics		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study
Mode of study	part-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	8.0
Learning profile	academic	Assessment form	
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr Andrzej Borzyszkowski	
	Teachers	dr Andrzej Borzyszkowski mgr Łukasz Mielewczyk	

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	E-learning hours included: 0.0						

Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
	Number of study hours	60	0.0	140.0	200

Subject objectives	Learning a relational database system. In the practical part, the student will prepare his/her own database project, as well as master the SQL language, which is a standard in database systems. In the theoretical part, the student will learn about the foundations of database design, the concept of transactions, the principles of integration in a programming environment, the principles of security and confidentiality present in database systems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[INFL3_W06] has a structured knowledge of various models of database systems, with particular emphasis on the relational model	understands entity and relationship diagrams -- ERD is able to use SQL to define data structure and manipulating data knows the concept of triggers and the programming side of database servers understands problems caused by concurrent access to a database, knows the concept of a transaction, is aware of problems caused by transactionality, e.g. deadlocks understands the context of using database systems in a wider development environment has basic knowledge of security and confidentiality rules in database systems	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[INFL3_U08] has the ability to select the type of database depending on the needs, create an adequate data model and use it to build database applications	prepares a database project in the form of an entity relationship diagram prepares a test database in accordance with his/her design and at the same time prepares triggers and SQL queries proving the ability to use the prepared database schema	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report
[INFL3_U02] can precisely formulate questions to deepen one's understanding of a given topic or find missing elements of reasoning	is able to precisely formulate questions to deepen his own understanding of a given topic or to find missing elements of a reasoning	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written [SU8] observation of student's independent or team work

Subject contents

- Main concepts: data, database, database management system, properties of database systems.
- Data modeling: entity relationship model, entity relationship diagrams, binary relationship classification, normalization.
- Relational model: tables, relations vs. tables, relationship schemas, keys and other integrity constraints. Mapping the entity and relationship diagram into a relational model. Relational algebra: choice, projection, joins, set theoretic operations, aggregate functions. Calculus of tuples. Calculus of domains.
- SQL: defining data, operating on data, performing relational algebra operations, nested queries, NULL values, perspectives.
- Server-side programming, triggers. Client-side programming, access to a database via the Internet.
- Concurrency management: transactions, isolation levels, locks and other tools.
- Safety in databases.
- Complexity of operations in databases, indexes, query optimizer.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
projest	50.0%	40.0%
exam	50.0%	40.0%
activity	0.0%	5.0%
test	30.0%	15.0%

Recommended reading

Basic literature	1. Richard Stones, Neil Matthew: Bazy danych i PostgreSQL. ISBN: 83-7197-650-X, Helion 2002.

	Supplementary literature	2. Eric Johnson, Joshua Jones Modelowanie danych w SQL Server 2005 i 2008. Przewodnik. Helion 2009. 3. R. Elmasri, S. Navathe, Fundamentals of Database Systems, Pearson 2007. 4. Judith S. Bowman, Sandra L. Emerson, Marcy Darnovsky: Podręcznik języka SQL. ISBN: 83-204-2596-4, Wydawnictwa Naukowo-Techniczne 2001. 5. C. J. Date, Wprowadzenie do systemów baz danych, WNT Warszawa, 2000. 6. J. D. Ulman. Systemy baz danych. WNT, Warszawa, 1988.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	What problem causes deletion in the presence of a foreign key? What are the solutions? Give a few examples of the use of triggers. What problems can appear because of concurrent access to a database ?	
Work placement	Not applicable	

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